Work Design and Older Workers: A Qualitative Comparison Between two Established Models in a Norwegian Knowledge-Intensive Company

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I am grateful for the opportunity to work on this project as part of my MA degree in Work and Organizational Psychology here at the Institute of Psychology. I remember the first year as being hectic with deadlines and presentations for external businesses. The second year has been a study of the psychology of organizations and also a study of my own motivation. Finding the energy and perseverance needed to finish this project was interesting and sometimes difficult. Now that I am only days away from finishing my five years of studying, I am experiencing a mixture of emotions. I am proud of the product I am about to deliver. At the same time, I am excited about what the future has to bring. I also feel some sadness knowing that my years as a student have come to an end.

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Kristian Moxnes, May 2013, Oslo

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Abstract

The aim of this study is twofold. First to compare an inductive (bottom-up) approach against two established models of work design; Herzberg et al.'s motivation-hygiene theory (HRZ) and Wilson et al.'s healthy work organization model (WIL). Second, to suggest work characteristics to be included in a life-span model of work design accounting for older workers and their needs. The subjects (N=11) were employees (age 60+) in a large Norwegian knowledge-intensive company. Interviews were semi-structured based on open-ended questions in the SWOT format. A content analysis first produced a bottom-up model containing 23 main categories. In addition, the present author coded the statements on the different levels within the SWOT and IGLOS frameworks, and lastly on the two established models of work design. HRZ and WIL were able to explain almost all of the statements from the interviews, indicating that the two models are relevant for measuring work characteristics among older workers in a Norwegian knowledge-intensive organization. Contrary to what was hypothesized, HRZ was able to explain a larger proportion of the statements from the interviews than WIL. Based on an inductive approach the current study was also able to uncover two unique categories that were not explained by HRZ or WIL. Our results indicate that future research should employ a life-span approach to work design and take into consideration older workers and their needs. Due to serious methodological limitations, it is important to state that the findings acquired in the current study cannot be generalized without further research.

Work Design and Older Workers: A Qualitative Comparison Between two Established Models in a Norwegian Knowledge-Intensive Company

My father, aged 71, is still working full time as an academic. He seems to be one of a growing number of older workers in this country with no intention to retire, some now actively opposing the mandatory retirement age, varying between 67 and 70 years. My father's motivation to keep working might be specific for academics, however it interesting to see what principles apply in other knowledge-intensive organizations, such as the one in the current study.

Because of an aging workforce, it is important to expand our understanding of the factors that influence the decision to retire. The government in Norway, as well as many European countries, has a pronounced policy to increase the retirement age. This policy is motivated by the current and future challenges faced by our society, as the population grows older. In particular, the age group 60–66 years is growing rapidly in Norway (St.meld. nr. 6, 2006–2007). In addition, people live longer and healthier lives. If society can motivate this age group to delay their retirement, this will help secure economic growth and welfare in the future.

The decision to retire is influenced by a complex array of factors, including pension systems, family life, health, work environment, job content, and organizational policy (for a review, see Feldman, 1994; Sterns & Miklos, 1995; Walker, 2005). One aim of the current study is to use the data from open-ended interviews to identify work characteristics that are important for older workers. In general, the study of work characteristics is rich and developed, but the study of work characteristics in relation to older workers is not. This topic of study is new, and developments of specific models within this domain are lacking.

The main goal of the current study is to compare two established models of work design with the work characteristics that emerge from the open-ended interviews. A second goal of the study is to suggest work characteristics to be included in a life-span model of work design accounting for older workers and their needs.

The interviews are based on SWOT questions addressing strengths, weaknesses, opportunities, and threats. This framework is a useful tool for organizational analysis and planning (Helms & Nixon, 2010), and a growing number of scholars are utilizing this framework within work environment studies (e.g., Hoff, 2009b, 2009c; Lone et al., 2013). The advantage of using the SWOT approach is that the interviewer brings up no predefined

categories other than the theme of the interview itself. This decreases the chance of the researcher influencing the topics that emerge during the interviews.

In addition to coding the statements from the interviews on different levels of SWOT, organization level will be added as a variable. Lone et al. (2013) showed that organizational aspects are important for knowledge workers when asked to reflect upon their work environment. Each statement will be coded on each of the five levels: individual, group, leadership, organization, and society (IGLOS). According to West, Hirst, Richter, and Shipton (2004), attention to the different organizational levels will foster a thorough understanding of organizational strengths and weaknesses. Studies also indicate that the experience of one's work environment differs with different levels of employee grade (e.g., supervisor, line manager, or secretary) (Morgeson & Humphrey, 2006). In line with this finding, Lone et al. (n.d.) argue that managers are more likely to be worried about issues regarding management and the organizational context (the leadership and organization levels), while other employees are more likely to be worried about issues regarding task and social features of work (the individual and group levels).

Adding organization levels also gives us the opportunity to address the proper organizational level if needed. This could be beneficial in developing organizational change initiatives in the future.

The Current Study – Background and Contribution

A student research group I was part of collected the interview data primo 2012. In this previous study, we collaborated with a large, knowledge-intensive, government-owned organization. This study was motivated by the need to increase the retirement age within the organization. Pension systems are a powerful tool to change retirement behavior, but according to Walker (2005), the individual organization has to be the prime focus for age management and adjustment to an ageing workforce. In line with this, the government in Norway encourages both employer and employee organizations to sign the IA Agreement (IA Agreement, 2010). This is an agreement regarding a more inclusive working life and is a policy instrument designed to help achieve goals related to employment, working environment, and inclusion policy. One of the three targets in this agreement is for "active employment after age 50 to be extended by six months. This means an increase in the average period during which people (over age 50) are actively employed, compared with 2009" (p. 3).

This agreement was a main motive behind the study we conducted primo 2012. To learn more about which factors contribute to retirement behavior, we conducted open-ended

interviews with people aged 60 and above who were currently employed in the organization. The goal was to learn more about the employees' subjective experience of being an older worker. The data was content analyzed, and this produced a bottom-up model of work characteristics. This approach is inductive, as data guides theory. A deductive approach (or top-down) is when theory guides the interpretation of the data. In addition to using an inductive approach, the current study seeks to utilize a deductive approach by exploring how two established models of work design can explain our interview data. The goal of the current study is therefore to extend our earlier work and compare the bottom-up model with two established models of work design: motivation-hygiene theory (HRZ) (Herzberg, Mausner, & Snyderman, 1959) and healthy work organization model (WIL) (Wilson, Dejoy, Vandenberg, Richardson, & McGrath, 2004). This comparison is important in order to accomplish the main goal of this study, namely to see if established models of work design can explain the interview data in a meaningful way. Another possible outcome is insight into relevant work characteristics for older employees. The secondary goal therefore naturally followed, namely to suggest work characteristics to be included in a life-span model of work design accounting for older workers and their needs. To my knowledge there is currently no study available with this research agenda.

In the following, I will first introduce and define the central concepts. I will then introduce the theoretical models of Herzberg et al. and Wilson et al. and explain why these models were selected for the present study.

Work Characteristics

One of the central premises in work design theory is that a well-designed job has work characteristics that lead to job satisfaction and well-being, which in turn leads to motivation and performance (Hackman & Oldham, 1976). Work design has been shown to affect a multitude of behavioral and psychological outcomes, such as performance, turnover, absenteeism (e.g., Hackman & Oldham, 1976), job satisfaction, internal work motivation, stress, and burnout (e.g., Parker & Wall, 1998).

As work characteristics are shown to influence a multitude of behavioral outcomes, it is likely that they will also influence retirement behavior. Based on a longitudinal study of male and female civil servants, self-rated health, employment grade, and job satisfaction are all independent predictors of early retirement, according to Mein et al. (2000). Also, Elovainio et al. (2005) found that work characteristics predict retirement behavior. Specifically, they found that self-rated health and stress have a role in the prediction of early retirement. Another study by von Bonsdorff et al. (2010) explored the relationship between

employee well-being and early-retirement intentions. They found that work characteristics such as job control, organizational commitment, and emotional exhaustion predicted well-being and retirement behavior among employees in the metal industry and retail trade. Social characteristics of work have also received some attention in relation to retirement behavior. In a study on nurses, Van der Heijden (2010) showed that social support is negatively related to the intent of retirement. A related result came from Morgeson and Humphrey (2006), showing that social work characteristics were strongly related to turnover intentions.

Social work characteristics have recently received attention from scholars within the area of work design (Grant & Parker, 2009; Humphrey, Nahrgang, & Morgeson, 2007; Oldham & Hackman, 2010). This attention might be indicative that work itself is changing. There is a global shift from manufacturing economies to service and knowledge economies that has changed the nature of work in organizations (Grant & Parker, 2009). Today, employees often work in temporary teams whose membership shifts as work requirements change (Humphrey et al., 2007; Oldham & Hackman, 2010). It is likely that this, and other changes, has altered the skills and recourses necessary to succeed in today's work life. The organization in the current study has highly educated employees who work on complex tasks, requiring cooperation across disciplines and geographical areas. It is therefore likely that the social characteristics of work are important for the subjects in the current study. Both HRZ model WIL include social characteristics of work.

Motivation-Hygiene Theory

According to Furnham (2012), Herzberg's seminal two-factor theory is unique, as it is one of very few theories within work psychology. It has been celebrated by many but has also received massive criticism for its lack of empirical support (Grant, Fried, & Juillerat, 2011). Bassett-Jones and Loyd (2005) claim that, despite the criticism, Herzberg's two-factor theory still has utility nearly 50 years after it was first developed. One of the central tenets of Herzberg's theory is the difference between motivation and movement. According to Herzberg (1968), "Movement is a function of fear of punishment or failure to get extrinsic rewards (…). Motivation is a function of growth from getting intrinsic rewards out of interesting and challenging work" (p. 97). Of the factors included in his two-factor theory, six of these are considered motivator factors: achievement, recognition for achievement, the work itself, responsibility, growth, and advancement. When present, these factors produce satisfaction and productivity. Different from these are what he calls hygiene factors (or movers), which are: company policy and administration, supervision, interpersonal relationships, working conditions, salary, status, and security (Herzberg, 1968, p. 92).

However, this distinction has not been established empirically and is not going to be a topic in this paper. In the current study, I will not attempt to validate his two-factor theory, but instead I will use his model to see if the work characteristics described in the model can explain our data in a meaningful way.

The biggest contribution from Herzberg's theory might be the emphasis he puts on job enrichment. He argues that in order to motivate employees, they need to be internally driven, and job enrichment is the only way to achieve this. According to Herzberg, job enrichment provides the opportunity for the employee's psychological growth, by promoting a sense of achievement, responsibility, and recognition for achievement (Herzberg, 1968). These work characteristics are included also in other influential models of work design (e.g., Hackman & Oldham's job characteristics model, or JCM), and they are believed to still be important in today's work life (e.g., Ramall, 2004).

Social characteristics of work were left out of Hackman and Oldham's (1976) JCM, but Herzberg included three social characteristics of work: relationship with supervisor, relationship with peers, and relationship with subordinates (see p. 17). In today's work life, with cooperation across disciplines and more focus on teams, it is assumed that these characteristics make the model a good choice for the present study. In addition, job enrichment provides workers with more responsibility and autonomy, two central concepts of the Working Environment Act (2006, § 4–2) in Norway.

Healthy Work Organization

The other model in question is Wilson et al.'s (2004) healthy work organization (WIL). Work organization generally refers to the way work processes are structured and managed, such as job design, scheduling, management, organizational characteristics, and policies and procedures (NIOSH, 1996, in Wilson et al., 2004, p.565). By definition, this model encompasses a broader range of factors than a model of job design, including individual, group, and organizational levels of analyses (DeJoy, Wilson, Vandenberg, McGrath-Higgins, & Griffin-Blake, 2010). This expanded level of analyses within work design theory is supported by Parker, Wall, and Cordery (2001). Wilson et al. define healthy work organization as:

> …characterized by intentional, systematic, and collaborative efforts to maximize employee well-being and productivity by providing well-designed and meaningful jobs, a supportive social-organizational environment, and accessible and equitable opportunities for career and work-life enhancement. (p. 567)

One of the assumptions behind the model by Wilson et al. is the idea that an organization, as a whole, can be healthy or unhealthy. Inherent in this idea is the belief that the structure and function of the organization can have an impact on the health and well-being of employees and finally on the effectiveness of the organization (Wilson et al., 2004, p. 565). Within this framework, healthy, satisfied, and productive individuals are a product of a healthy organization. The idea that an organization can be healthy is interesting and has implications for the way we think about work. Within this idea, the organization itself is not just composed of individual elements (people, structure, etc.), but the organization is given human properties like function and health. By definition, *work organization* includes a broader range of work characteristics than *work design*. However, for practical purposes, work design and work organization are regarded as equal in the present study. They are both regarded as models of work design, with the basic assumption that work characteristics influence satisfaction and well-being, which in turn influence motivation and productivity.

The Working Environment Act (2006, § 1–1) in Norway urges organizations to create work environments that provide opportunities for healthy and meaningful working situations. This focus on the organization as a key element in developing the work environment is in line with Wilson et al. (2004). The healthy work organization model is believed to be a good choice for the current study because it is designed to fit the modern work life. Its focus on organizational and social aspects is believed to be a strength and in line with both the Norwegian Working Environment Act and on recent literature on work characteristics (Grant & Parker, 2009; Humphrey et al., 2007; Oldham & Hackman, 2010)

By comparing the bottom-up model with the two established models of work design, the current study seeks to clarify whether HRZ and WIL are relevant and applicable models when it comes to measuring work characteristics among older workers in a knowledge-intensive organization in Norway.

Hypotheses

The current study seeks to determine whether an inductive approach or a deductive approach is better at explaining the data material. The present study was based on semi-structured open-ended interviews. According to Bakker and Demerouti (2007), open-ended interviews help discover important aspects of the work environment that might be overlooked by qualitative instruments. This statement describes one of the advantages of the inductive approach. As the data guides the development of theory, the inductive approach should be superior when the topic of study is new. As the topic in the current study (work characteristics among older workers in a knowledge-intensive organization) is new and not

well studied, it is expected—in accordance with Bakker and Demerouti's opinion (above)—that an inductive approach (bottom-up model) will explain a larger number of statements than a deductive approach (HRZ and WIL). Hypothesis 1 is therefore:

> There will be a significant difference in the number of statements captured by the two work design models (HRZ and WIL) compared to the bottom-up model, with a majority of statements coded on the bottom-up model.

In my opinion, WIL is modern compared to HRZ. Since HRZ was introduced in 1959, hundreds of articles have been written, and many models of work design have been suggested (Morgeson & Humphrey, 2006). WIL has a broader focus than HRZ, including individual, group, and organizational levels of analyses. Their model is also designed to include the organizational context, distributed on three primary areas: work itself, the tools and technologies used in the work, and the social-organizational and physical environment (Wilson et al., 2004, p. 566). Grant and Parker (2009) supports this broader focus, as scholars the last four decades have realized that jobs vary in terms of not only the work characteristic included in the classical theories of job design (e.g., Hackman & Oldham, 1976; Herzberg et al., 1959; Turner & Lawrence, 1965). Based on the broader focus of WIL, it is expected that this model will be able to capture a larger number of statements than HRZ. Hypothesis 2 is therefore:

> There will be a significant difference in the number of statements captured by the two established models of work design (HRZ and WIL), with a majority of statements captured by WIL.

Unique Categories for Older Workers

This study also seeks to uncover work characteristics that are important for workers (aged 60 years and more), when are asked to reflect upon the senior policy in their own organization. As people age, it is natural to assume that in addition to physical change, people also change their behavior, their needs and their preferences. According to Carstensen (1995), there are two fundamentally different approaches to explain age-related change. In the traditional approach, age-related change is seen as evidence of processes associated solely with old age. Within this approach any age-related change is attributed to age. In contrast, the life-span approach attempts to explain age-related change as caused by a complex array of factors influenced by the person's past, present, and future. This approach acknowledge that

an aging individual goes through certain physical and behavioral changes, however these age-related changes are very individual and due to both social and cultural factors (Sterns & Miklos, 1995).

Within a life-span approach to work design and older workers, I believe it is fruitful to look for characteristics of work that are seen as important by older employees. If unique categories are uncovered, this information can be used and implemented in a life-span model of work design accounting for older workers and their needs. It is my belief that such a model of work design can strengthen the quality of a model as it opens up for age-related needs and preferences, but without specifically linking these needs and preferences to age. In line with this claim, Ausland (2002) argues that a life-span approach can replace a specific policy for older workers. By continuously focusing on individual needs throughout an employee's career, specific policies for older employees might be rendered unnecessary. Within this approach to the management of employees the employee is not labeled as "older worker", a categorization that by itself can have unwanted consequenses such as predjudice and discrimination (Midtsundstad, 2006).

Methods

The Research Project

The interviews used in this study were part of a data collection in a group project I worked on in primo 2012 in the subject PSY4430. This subject was part of my MB leading up to this master thesis. In total, our group conducted 44 interviews in a government-owned Norwegian knowledge-intensive company. The aim of this study was to learn more about what factors contribute to the retirement decision for employees above the age of 60. Based on the interviews a content analysis produced a bottom-up model of work characteristics consisting of 23 main categories. The goal of the current study is to extend this work and compare the bottom-up model with the two established models of work design: motivation-hygiene theory and healthy work organization. A second goal of the study is to suggest work characteristics to be included in a life-span model of work design accounting for older workers and their needs.

Sample

In the current study, 11 of 44 interviews were chosen to be included. The reason for this selection was the time-consuming task of coding all 44 interviews. Eleven interviews were chosen because these were conducted, unitized, and coded by the present author. Being

a single coder, this means that there is a consistency in the way the 11 interviews are coded, of course, with the risk of systematic biases. Hruschka et al. (2004) claims that when a group of people code interviews, they will initially produce very different codes. During our initial study primo 2012, this is exactly the experience we had. Although we had regular meetings to improve the reliability of the coding process by producing coding manuals (as recommended by Hruschka et al.), we observed that the average length of codes varied a great deal between the different coders. As we had no measure of inter-rater reliability in the study conducted primo 2012, and to ensure consistency in the coding process in the current study, only the interviews coded by the present author were included.

The 11 subjects were from one of five company regions in Norway, and the subjects varied in position; three subjects were supervisors, two were mercantile workers, and six were technical workers (engineers and other employees with technical background). All the subjects were male, and the average age was 62.9 years (SD = 1.6), ranging between 61 and 65 years. Position level is not included in the analysis in the current study, as the sample size is too small to produce any robust findings. Our client arranged cluster sampling based on considerations of geography and other practical reasons. Cluster sampling means that you select groups of people and not individuals (Langdridge, 2006). This method of sampling is not random, and as our sample size is small (11 subjects) and from only one region in one organization, our sample is probably not representative of a wider population. The population of interest in this study is older employees (60+) in this particular knowledge-intensive organization. Based on the representativeness of our sample, we cannot generalize our results, but this is in my opinion not critical for testing of the two hypotheses. This demands only a comparison of the number of statements that can be allocated on the different models.

Measures

Interviews were semi-structured based on open-ended questions in the SWOT format, as presented on page 2. The reasoning behind the use of SWOT-based interviews was to encourage reflection among the subjects along the three dimensions: positive—negative, past —future, and internal—external (Hoff, 2009a). The SWOT analysis is most often used as a reliable tool for strategic planning purposes for businesses, and research supports SWOT analysis as a tool for planning purposes (Helms & Nixon, 2010). The subjects were asked to reflect upon the following four questions:

1) "What do you consider good (a strength) with the senior policy in your company?"
2) "What do you consider the weakness with the senior policy in your company?"
3) "What possibilities do you see for the senior policy in your company?"

4) "What are the threats hindering improvement of the senior policy in your company?"
Note: My translation (for original, see Appendix A)

To extract as much information as possible from each subject, follow-up questions were asked to help the subject elaborate and clarify specific statements. For example, "You mentioned… could you elaborate on that? Are there any other weaknesses regarding the senior policy in your company?*"* (See interview guide, Appendix A)

Procedure

The author was trained in conducting interviews as part of the MA education. The training was a combination of theory and practical exercises debriefed with video. The theoretical framework for the training was the PEACE structure (Clarke & Milne, 2001). A letter of consent was sent out to each subject prior to conducting the interviews (see Appendix B). The interviews were conducted in March 2012 in two different cities in Norway. Each interview was recorded digitally and lasted between 25 and 60 minutes. All interviews were performed in Norwegian.

Data Treatment and Analysis

Transcriptions. Different systems of transcribing are available, but no standard way of transcribing has been established (Flick, 2009). The goal when transferring speech to text was to maintain the meaning of the statements and at the same time to improve grammar and flow. This was achieved by excluding all filler words and sounds like *ums* and *ers*. This saved us time, and at the same time, the transcriptions were easy to read and understand. The software Trinscribe! version 8 from Seventh String was used when transcribing the interviews.

Content analysis. Content analysis is a qualitative method to extract codes with meaning from the data material. The first step in the content analysis is unitizing. This means breaking down the text into statements that give meaning to the researcher. A meaningful statement could be a single word or longer text segments, but the meaning within each unit is the same. There is always an element of interpretation when unitizing, and a consistent interpretation is important to maintain sufficient reliability (Krippendorff, 2004). In the current study, a unit was defined as the smallest meaningful statement that reflects the informant's experience and understanding of the topic of interest. In total, the unitizing produced 406 unique statements across 11 subjects. The unitizing was done in Microsoft Excel v.14.1.0.

The second step in the content analysis was attaching codes to each statement. This

was done in three stages. Stage one was developing categories as they emerged from the statements themselves. This was a bottom-up approach and was part of the study conducted primo 2012. During the coding process, we identified 23 main categories and 60 subcategories. The second stage was coding on the four SWOT dimensions and on four organizational levels and one society level (individual, group, leadership, organization, and society: IGLOS). If a statement did not fit into the categories, it was coded as a residual on either SWOT or IGLOS, or both. The IGLOS framework was used to provide information regarding which level of the IGLOS framework the statement was directed towards (For the complete coding scheme, see Appendix C).

In the third stage of the coding process (conducted ultimo 2012), the statements were additionally coded on the two separate and established models of work environment: Herzberg et al.'s motivation-hygiene theory (HRZ) and Wilson et al.'s model of healthy work organization (WIL). The statements that were not covered by the models were coded as residuals. HRZ consists of 16 categories, and WIL consists of 29 categories. (see coding scheme, Appendix C).

Coding reliability. As the author conducted all the coding, there was no measure of inter-coder reliability. To ensure coding reliability, two of the interviews were coded twice (on HRZ and WIL). A reliability analysis using the Kappa statistic was performed to determine consistency in the rating. For the coding of Herzberg's model, the reliability was found to be Kappa = 0.712 ($p < .0.001$), 95% CI (0.587, 0.837). For WIL, the reliability was found to be Kappa = 0.789 ($p < .0.001$), 95% CI (0.678, 0.900). Neuendorf (2002) claim there is no established consensus on what is an acceptable level of coding reliability in a content analysis, but according to Landis and Koch (1977), a Kappa between 0.60 to 0.79 is considered substantial. The reliability results acquired in this study range between 0.71 and 0.79 and are considered acceptable.

Data Treatment and Statistics

The data consisted of 406 meaningful statements coded first bottom-up, then on SWOT and IGLOS (completed primo 2012) and lastly on the two established models of work design (completed ultimo 2012). The data material was then analyzed using IBM SPSS Statistics version 20.

To test the two hypotheses, the data was aggregated on an individual level, and paired T-tests were performed to determine a significant difference in the number of statements the two models (HRZ and WIL) could explain. This was also performed between the bottom-up approach and the two top-down models. On all comparisons, alpha level $p < .05$ was adopted

as a criterion for establishing statistical significance. Bonferroni correction to avoid type I error was applied whenever pairwise tests were conducted.

Comparing the models based on average number of statements is considered to be acceptable to answer our hypotheses, but it is not acceptable in order to explain *why* the models differ. Therefore, a number of descriptive analyses were produced to tap into and attempt to explain the underlying cause of the differences between the models. Especially relevant is the table presenting a top 8 ranking (see Table 8, p. 20), showing number of statements coded on each category within each of the three models, on each level of SWOT.

Ethical Considerations

Ethical considerations were evaluated throughout the study, and the research project adhered to the Norwegian ethical standards for research on human beings and was approved by the Norwegian Social Science Data Services (NSD). The study gathered no sensitive data on the subjects, but questions of anonymity had to be addressed. The data collected regarding each subject was never attached to a name. A password-protected server at the University of Oslo stored that data, and collected audio files from the interviews were deleted immediately after transcription.

Prior to conducting the interviews, each subject read through and signed a letter (see Appendix B) of consent. It was stated that participation in the study was voluntary and withdrawal from the study could be done at any time without having to state a reason. The letter also assured the participants of confidentiality of the information given in the interviews.

Results

Descriptive Statistics

A total of 406 meaningful statements were identified. 377 (93%) statements were covered by HRZ, 326 (81%) by WIL, and 403 (99.6%) by the bottom-up model (see Table 1). The SWOT-category with the most statements was “Opportunities”, covering 37% of the statements. See Table 1 for a distribution of statements covered by the three models on each of the four SWOT-categories.

Table 1: *No of statements explained by the different models*

	SWOT				
Model	Strengths	Weaknesses	Opportunities	Threats	Total
(HRZ+WIL)	96	95	142	57	391
HRZ	85	94	141	56	377
WIL	83	81	121	42	326
BOTTOM-UP	99	99	145	60	403

Note. Table shows total no of statements that could be recognized either by a combination of HRZ and WIL, by HRZ alone, by WIL alone, and the bottom-up model.

On average 34.3 statements from each individual were coded on HRZ, 29.8 statements were coded on WIL, and 36.9 statements were coded on the bottom-up model. A combination of HRZ and WIL captured 35.6 statements per individual. For standard deviations and standard error, see Table 2 below.

Table 2: *Descriptive statistics comparing the three models*

	Samples statistics			
	N	Mean	SD	SE
HRZ	11	34.3	13.95	4.21
WIL	11	29.8	13.73	4.14
BOTTOM-UP	11	36.9	14.32	4.32
(HRZ+WIL)	11	35.6	14.80	4.46

Note: Table shows mean number of statements per individual, standard deviations, and standard error.

Table 3 shows the average number of statements (and standard deviations) per individual and how they were distributed on each level of SWOT and IGLOS. See Table 3 below.

Table 3: *Mean and standard deviations for SWOT- and IGLOS-statements from the bottom-up analysis*

	N	M	SD	SE
SWOT				
Strengths	11	9.0	5.94	1.79
Weaknesses	11	9.0	5.53	1.67
Opportunities	11	13.2	7.92	2.39
Threats	11	5.5	2.84	.86
IGLOS				
Individual	11	7.1	3.11	0.94
Group	11	6.6	6.23	1.88
Leadership	11	7.3	5.24	1.58
Organization	11	15.0	7.51	2.26
Society	11	0.8	0.98	0.30

A total of 403 statements could be coded on SWOT and IGLOS. The SWOT-category accounting for the most statements was “Opportunities” (145 statements). The IGLOS-category accounting for the most statements was “Organization” (163 statements). See Table 4 below.

Table 4: *Distribution of SWOT-statements on organizational level (IGLOS)*

	SWOT				
IGLOS	Strengths	Weaknesses	Opportunities	Threats	Total
Individual	33	15	17	13	78
Group	24	17	18	14	73
Leadership	6	18	46	10	80
Organization	34	47	64	18	163
Society	2	2	0	5	9
Total	99	99	145	60	403

Note: Of the total number of statements, 403 of 406 statements could be coded on IGLOS and SWOT.

As Table 1 shows, a total of 377 statements (N=11) were coded on HRZ. Of the 16 categories within HRZ, ”Company policy” was the category covering the most statements (78). See Table 5 below.

Table 5: *Number of statements coded on each category within HRZ on each level of SWOT*

	SWOT				
Main categories	Strengths	Weakness	Opportunities	Threats	Total
Achievement	3	0	3	2	8
Recognition	6	14	19	6	45
Work itself	11	5	12	9	37
Responsibility	7	3	12	0	22
Advancement	0	0	0	0	0
Growth	2	0	4	0	6
Company policy	16	23	27	12	78
Supervision	0	2	17	0	19
Rel. w/supervisor	4	3	6	1	14
Work Conditions	17	8	13	10	48
Salary	14	33	19	7	74
Rel. w/peers	3	2	6	2	13
Personal life	0	0	1	5	6
Rel. w/subordinates	0	0	2	0	2
Status	0	0	0	0	0
Security	2	1	0	2	5
Total	85	94	141	56	377

As Table 1 shows, a total of 326 statements (N=11) were coded on WIL. Of the 29 categories within WIL, ”Distributive equity” was the category covering the most statements (76). See Table 6 below.

Table 6: *Number of statements coded on each category within WIL on each level of SWOT*

	SWOT				
Main categories	Strengths	Weaknesses	Opportunities	Threats	Total
Workload	1	10	10	7	28
Control/autonomy	8	3	7	0	18
Job content	6	2	9	9	26
Role clarity	1	1	0	0	2
Physical work demands	0	0	1	0	1
Environmental conditions	0	0	1	0	1
Work scheduling	1	0	1	0	2
Organizational support	5	11	16	4	36
Coworker support	2	3	4	4	13
Participation w/supervisors	5	4	19	1	29
Participation w/others	1	0	5	0	6
Involvement work practices	1	1	5	0	7
Communication	0	8	4	0	12
Safety and health climate	1	0	0	0	1

Note: Table 6 continues on next page

Continuation of Table 6…

Main Categories	SWOT				Total
	Strengths	Weaknesses	Opportunities	Threats	
Job security	2	1	0	2	5
Procedural equity	0	0	0	0	0
Distributive equity	13	35	20	7	76
Learning opportunities	4	0	7	0	11
Flexible work arrangements	15	0	2	2	19
Job satisfaction	8	0	7	2	17
Organizational commitment	0	1	0	0	1
Job stress	0	1	1	0	2
Work self-efficacy	1	0	0	3	4
Work impact	3	0	2	0	5
Perceived health	5	0	0	1	6
Perceived safety at work	0	0	0	0	0
Alcohol use	0	0	0	0	0
High risk health behaviors	0	0	0	0	0
Preventive health behaviors	0	0	0	0	0
Total	83	81	121	42	326

A total of 403 statements (N=11) were coded on the bottom-up model. Covering most statements was the category ”Job content” (67) and the SWOT category ”Opportunities” (145). See table 7 below.

Table 7: *Number of statements coded on each category within the bottom-up model on SWOT*

	SWOT				
Main Categories	Strengths	Weaknesses	Opportunities	Threats	Total
Working conditions	0	0	0	0	0
Work environment	14	0	9	4	27
Job content	13	12	35	7	67
Flexibility	20	1	8	1	30
Health	6	0	0	1	7
Information	1	3	2	0	6
Sharing knowledge	1	3	21	2	27
Salary	10	11	17	4	42
Own expertise	4	0	1	0	5
Recognition	1	11	15	3	30
Organizational culture	3	2	1	1	7
Change of organizational structure	0	1	0	4	5
Reduced working hours	13	3	3	4	23
Recruitment of staff	0	1	4	3	8
Relationship with supervisor	1	1	0	1	3
Rel.-ship to younger employees	0	3	2	1	6
Fairness	0	24	6	2	32
Senior politics	8	22	17	7	54
Government	0	1	0	0	1
Technology	1	0	2	8	11
Turnover intention	0	0	0	2	2
Development	3	0	2	0	5
State of the market	0	0	0	5	5
Total	99	99	145	60	403

Covering most statements within WIL was "Distributive equity" (76), within HRZ "Company policy" (78), and within the bottom-up model "Job content" (67). See table 8.

Table 8: *Top 8 SWOT-categories within the 3 models*

Model/categories	SWOT				Total
	Strengths	Weaknesses	Opportunities	Threats	
WIL					
Distributive equity	13	35	20	7	76
Organizational support	5	11	16	4	36
Participation w/supervisors	5	4	19	1	29
Workload	1	10	10	7	28
Job content	6	2	9	9	26
Flexible work arrangements	15	0	2	2	19
Control/Autonomy	8	3	7	0	18
Job satisfaction	8	0	7	2	17
HRZ					
Company policy	16	23	27	12	78
Salary	14	33	19	7	74
Work conditions	17	8	13	10	48
Recognition	6	14	19	6	45
Work itself	11	5	12	9	37
Responsibility	7	3	12	0	22
Supervision	0	2	17	0	19
Rel. w/supervisor	4	3	6	1	14
BOTTOM-UP					
Job content	13	12	35	7	67
Policy for older workers	8	22	17	7	54
Salary	10	11	17	4	42
Fairness	0	24	6	2	32
Flexibility	20	1	8	1	30
Recognition	1	11	15	3	30
Sharing knowledge	1	3	21	2	27
Work environment	14	0	9	4	27

Table 9: *Sub-themes within the top 8 SWOT-categories from the bottom-up model*

Main theme	Sub-theme	SWOT		Total
		Strengths/ Opportunities	Weaknesses/ Threats	
Job content	General	0	0	0
	Interesting tasks	7	0	7
	Variation in tasks	0	0	0
	Meaningful tasks	4	0	4
	Job redesign	36	6	42
	Work load	1	13	14
	Possibility to work	0	0	0
	TOTAL	**48**	**19**	**67**
Senior policy	General	7	12	19
	Knowledge of	12	9	21
	Focus senior policy	6	8	14
	TOTAL	**25**	**29**	**54**
Salary	General	9	0	9
	14 “senior policy days” as salary	2	0	2
	4-5% of gross salary	0	3	3
	Extra salary grade	8	2	10
	Salary progression	0	0	0
	Early retirement scheme	0	0	0
	Age pension	3	5	8
	Performance salary	4	3	7
	Difference between state and private	1	2	3
	TOTAL	**27**	**15**	**42**
Fairness	**TOTAL** (no subtheme)	**6**	**26**	**32**
Flexibility	General	1	0	0
	Work hours	8	0	8
	14 “senior policy days” as salary	3	0	3
	Autonomy	12	2	14
	Job content	0	0	0
	Early retirement scheme	0	0	0
	Age pension	4	0	4
	TOTAL	**28**	**2**	**30**
Recognition	**TOTAL** (no subtheme)	**16**	**14**	**30**
Sharing knowledge	**TOTAL** (no subtheme)	**22**	**5**	**27**
Work environment	General	3	0	3
	Job satisfaction	13	2	15
	Solidarity	7	1	8
	Cooperation	0	0	0
	Composition	0	1	1
	TOTAL	**23**	**4**	**27**

Reliability

To test reliability two of the 11 interviews were coded twice. For the coding of HRZ, the reliability was found to be Kappa = 0.712 (p <.0.001), 95% CI (0.587, 0.837):

$0.712 \pm 1.96SE = 0.712 \pm 1.96 * 0.064 = 0.712 \pm 0.125$

For WIL, the reliability was found to be Kappa = 0.789 (p <.0.001), 95% CI (0.678, 0.900):

$0.789 \pm 1.96SE = 0.789 \pm 1.96 * 0.057 = 0.789 \pm 0.11$

Statistical Differences

A pairwise test of significance showed that four of the ten pairs of IGLOS are significantly different from each other (se Table 11 below). These are:

Pair 4: $t(10) = 5.56$, $p < .05$.
Pair 8: $t(10) = -4.21$, $p < .05$
Pair 9: $t(10) = 4.29$, $p < .05$
Pair 10: $t(10) = 6.61$, $p < .05$

Table 11
Correlations between the IGLOS-categories

	Comparisons	Mean difference	SD	t	Sig. (2-tailed
Pair 1	Individual & Group	.46	5.61	.27	.794
Pair 2	Individual & Leadership	-.18	7.13	-.09	.934
Pair 3	Individual & Organization	-7.91	8.50	-3.09	.012
Pair 4	Individual & Society	6.27	3.74	5.56	.000*
Pair 5	Group & Leadership	-.64	7.85	-.27	.794
Pair 6	Group & Organization	-8.36	8.74	-3.17	.010
Pair 7	Group & Society	5.82	6.56	2.94	.015
Pair 8	Leadership & Organization	-7.73	6.08	-4.21	.002*
Pair 9	Leadership & Society	6.46	4.99	4.29	.002*
Pair 10	Organization & Society	14.18	7.11	6.61	.000*

*p<0.005 after Bonferroni correction of alfa-level.
Note: Table shows that the mean differences in statements between the different levels of IGLOS are not significant at the 0.05 level, except Pair 4, 8, 9 and 10.

Table 12: *Pairwise test of significance between the four models*

	Comparisons	Mean difference (statements)	SD	t	Sig. (2-tailed
Pair 1	Bottom-up–HRZ	2.64	2.66	3.29	.008*
Pair 2	Bottom-up–WIL	7.09	4.06	5.79	.000*
Pair 3	HRZ–WIL	4.45	4.16	3.56	.005*
Pair 4	(HRZ+WIL)–Bottom-up	1.36	1.50	3.01	.013

*p<0.0125 after Bonferroni correction of alfa-level
Note: Table shows that the mean differences in statements between the models are significant on the 0.05 level, except pair 4. See Table 2 for means per model.

Testing the Hypotheses

Pairwise t-tests were conducted to test the two hypotheses.

Hypothesis 1. HI predicted that there would be a significant difference in the number of statements captured by the two models (HRZ and WIL) compared to the bottom-up model, with a majority of statements coded on the bottom-up model. To test this hypothesis, pairwise t-tests were conducted (see Table 12). There was a significant effect for model type:

Bottom-up–HRZ: $t(10) = 3.29$, $p < .05$

Bottom-up–WIL : $t(10) = 5.79$, $p < .01$

The bottom-up model explained a significant larger number of statements compared to the two top-down models HRZ and WIL. The bottom-up approach explained on average 36.9 statements per individual, versus 34.3 for HRZ and 29.8 for WIL (see Table 2). This result supports hypothesis 1.

Hypothesis 2. H2 predicted that there would be a significant difference in the number of statements captured by the two established models of work design, with a majority of statements coded on WIL. To test this hypothesis, pairwise t-tests were conducted (see Table 12). There was a significant effect of model type, $t(10) = 3.55$, $p < .05$, with HRZ explaining more statements than WIL. As already seen above, on average, 34.3 statements per individual are explained using HRZ versus 29.8 statements using WIL. Wilson et al.'s organization-focused model explains a smaller number of statements than Herzberg's individual-focused model. This result is opposite of what was predicted and indicates that hypothesis 2 should be rejected.

In addition to the hypotheses laid out in this study, it is found that a combination of the two top-down models can explain almost as many statements as the bottom-up model. As Table 2 shows, on average, 36.9 statements per individual are explained using the bottom-up approach, versus 35.6 statements using a combination of HRZ and WIL. There was a nonsignificant effect of model type, $t(10) = 3.01$, $p > .05$, with a combination of the two top-down models explaining as many statements as the bottom-up approach (see Table 12).

A pairwise test of significance showed that the three models are significantly different from each other based on the average number of statements from each individual. There was a significant effect of model type but not when combining the two top-down models (see Table 12).

Secondary Goal – to Uncover Unique Categories for Older Workers

As argued in the introduction, this study seeks to uncover work characteristics that are important for workers aged 60 years and beyond, when asked to reflect upon the age-specific policies in their own organization. Based on the bottom-up model, the results acquired in the present study uncovered two unique categories not covered by HRZ and WIL. The categories ”Job redesign” and “Sharing knowledge” covered respectively 10% and 7% (42 and 27 statements) of the total number of statements (403) (see Table 8 and 9). This result and its implications will be examined at length in the discussion part.

Discussion

Main Findings

The main purpose of the current study was to compare the bottom-up model against two established models of work design; Herzberg’s motivation-hygiene theory (HRZ) and Wilson et al.’s healthy work organization model (WIL). Coding of statements from 11 semi-structured interviews gave the data needed to answer the two hypotheses in this study. In addition, this comparison can help us explain the salient qualitative differences between the models. A secondary purpose of the current study is to suggest work characteristics to be included in a life-span model of work design accounting for older workers and their needs. The main findings from the study are:

1. There is a significant difference between the two top-down models and the bottom-up model, measured in number of statements captured by each model.
2. There is a significant difference between the two top-down models, measured in number of statements captured by each model.

3. The two top-down models jointly cover a considerable number of statements (96%).
4. The IGLOS level "Organization" explains more statements than any other level of IGLOS. "Organization" captures 41% of the statements, while the second largest category, "Leadership," captures 20% of the statements. This difference is significant.
5. The category with the most statements within Herzberg's model is "Company policy" (21%).
6. Two unique categories accounting for a considerable number of statements were uncovered by the bottom-model: "Job redesign" captured 10% of the statements, while "Sharing knowledge" captured 7% of the statements.
7. A category accounting for statements regarding *salary* is within the top three categories across all three models.
8. *Social characteristics* of work cover 9% of the statements using HRZ and 15% of the statements using WIL.

Hypothesis 1 stated that the bottom-up approach would capture more statements than each of the two top-down models (HRZ and WIL). In total, the bottom-up approach captured 403 meaningful statements, compared to 326 and 377 for WIL and HRZ. This difference is significant for both models and supports hypothesis 1. According to Bakker and Demerouti (2007), it is reason to believe that open-ended interviews help discover important aspects of the work environment that otherwise might be overlooked by qualitative instruments. This assumption describes one of the advantages of the inductive approach. As the data guides the development of theory, the inductive approach should be superior when the topic of study is new (e.g., see Glaser & Strauss, 1967). As the topic in the current study (work characteristics among older workers in a knowledge-intensive organization) is new and not well studied, it was expected that a thematic analysis (inductive approach) would explain a larger number of statements than the two established models (deductive approach). The results acquired in the present study were therefore expected and indicates support for hypothesis 1.

Hypothesis 2 predicted that the organization-focused model proposed by Wilson et al. (WIL) would explain a significantly larger number of statements than the individual-focused model of Herzberg (HRZ). WIL is quite modern compared to HRZ and also has a broader focus, including individual, group, and organizational levels of analyses. It was therefore predicted that WIL would capture more statements than HRZ. In total, HRZ captured 377 statements, compared to 327 for WIL. This difference was significant, but contrary to what was predicted, HRZ captured more, not fewer, statements than WIL. This indicates a

rejection of hypothesis 2. It was also found that the two models jointly cover a considerable number of statements (391 statements). The reasons for these results will be discussed in the following.

General Discussion

The results indicate support for hypothesis 1, as the bottom-up model was able to explain a significantly larger number of statements (99%) than both Herzberg's model (93%) and Wilson's model (81%). The number of statements covered by Herzberg's model is high compared to a similar study by Hoff et al. (2009). They used the same approach with open-ended interviews and SWOT but with two different established models: the organizational climate measure (Patterson et al., 2005) and the job characteristic model (Hackman & Oldham, 1976). The two models explained 86% and 61% of the statements, respectively. An attempt to explain the large number of statements covered by Herzberg's model in the current study will be given in the following discussion.

The results indicate a rejection of hypothesis 2, as Herzberg's individual-focused model explained more, not fewer, statements than the organization-focused model of Wilson et al. This result indicates that Herzberg's model still has relevance in today's work life. His two-factor theory has been abandoned by most researchers due to the lack of empirical support (Grant et al., 2011), but our results seems to support the idea that the work characteristics in HRZ are able to cover many of the important dimensions of work life today. HRZ explained a total of 93% of the statements from the interviews. This is a surprising result for at least three reasons.

Firstly, HRZ has fewer categories (16) compared to WIL (29). It is reasonable to assume that a model including a *larger number* of work characteristics will be able to explain a larger number of statements. This was not the case and indicates that HRZ is more general and spans a broader range of work characteristics. To find categories that are not too specific or too general is emphasized by Morgeson and Humphrey (2006). If a model has categories that are too specific, it will only be useful in a very limited set of circumstances (e.g., only one type of job). If the opposite is true, that a model has categories that are too general, the model might be able to explain a variety of circumstances, but the interpretation of the results will suffer (e.g., Lone, 2013; Bakker and Demerouti, 2007). A valuable interpretation of results is dependent on a model that can explain the data in a meaningful way. If the categories in a model are too general, the interpretations will suffer as a result of too much variety within each factor or category. A good model will have a good fit with reality and be able to measure the salient qualities of work life, much like a good factor analysis yields

strong and unrelated factors. Today, more and more researchers agree that models of work design should be designed to the specific work context under study (e.g., Bakker and Demerouti, 2007; Parker at al., 2001). This approach is also in line with a resent study by Lone et al. (2013), showing that situation-specific instruments were superior (compared to general instruments) at capturing the salient work characteristics within a knowledge-intensive organization. Based on our data, it cannot be concluded that the categories in Herzberg's model are too general, but the results acquired in this study indicate that they might be. Further analyses and comparisons of the models are needed for a solid conclusion.

Secondly, the results are surprising, given the fact that the model by Wilson et al. has a *broader focus* by definition, including individual, group, and organizational levels of analyses (Wilson et al., 2004). The model by Wilson et al. is called a model of healthy work organization. As stated earlier, work organization generally refers to the way work processes are structured and managed, such as job design, scheduling, management, organizational characteristics, and policies and procedures. Herzberg's model, on the other hand, is a typical job design theory limited to an individual level of analysis. As work organization by definition has a broader focus than *job design,* it was therefore expected that WIL would be able to explain a larger number of statements than HRZ. This study gave the opposite result, which demands further discussion. Either the reliability and the validity of the result acquired in the current study are weak, or the scope of HRZ is not as narrow as first assumed. This requires further scrutiny, and based on the current study, one cannot exclude either explanation.

Thirdly, that HRZ explains a total of 93% of the interview statements is surprising considering that the IGLOS-level capturing the most statements was "Organization" (41%). WIL, not HRZ, is designed to capture characteristics on the level of the organization, and therefore it would be expected that this model would benefit from this skewed distribution of IGLOS-statements. In contrast to this, the IGLOS-level "Leadership" captured the second largest number of statements (20%), and the difference between these two levels was significant. Whether this finding reflects a general phenomenon or is specific to this study is not known. The finding that "Organization" was the most frequent IGLOS-category is consistent with a similar research design by Lone et al. (2013), also on a knowledge-intensive organization. This supports the assumption that this is general for (Norwegian) knowledge-intensive organizations. The wording in the interview questions might also help to explain the large number of statements coded on the IGLOS-level "Organization." It might be that wording primed the subjects to speak about topics that easily fall within the IGLOS-level

"Organization." Each of the four questions in the open-ended interviews mentioned the name of the organization they work in, possibly priming the subjects to speak about characteristics on the level of the organization. Another aspect explaining the large number of statements coded on the IGLOS-level "Organization" might be the degree of reflection among the subjects. Considering the education, age, and position of the subjects, it is likely that they have a more reflective view on both their own situation and their own organization.

To summarize, it is surprising for three reasons that HRZ is able to explain a larger number of statements than WIL: 1) WIL includes a larger number of work characteristics (29 compared to 16), 2) WIL has a broader focus including individual, group, and organizational levels of analysis, and 3) the IGLOS-level capturing the most statements was "Organization" (which was predicted to benefit the use of WIL). An attempt to explain these findings will be presented in the following section.

Company policy. Why did HRZ capture more statements than WIL? The explanation proposed here is a difference in the quality of the categories in each model. WIL has many categories, but each category captures a very specific work characteristic. HRZ also has categories that are specific, but one of the categories in HRZ is very general. The category "Company policy and administration" captured many statements not captured by WIL. This category captured more statements than any other category in the content analysis (21% of the statements). Herzberg et al. (1959) described this category as "those components of a sequence of events in which some overall aspect of the company was a factor" (p. 48). They identified two kinds of characteristics, one involving statements about the adequacy or inadequacy of company organization and management, the second involving statements about the harmfulness or beneficial effects of the company's policies. No category in WIL captured the same kind of statements. This category is also unique compared to Hackman and Oldham's (1976) job characteristics model, as no such category exists among their five core job dimensions. These five job dimensions were skill variety, task identity, task significance, autonomy, and feedback (Hackman & Oldham, 1976, p. 257). The uniqueness of the category "Company policy and administration" within HRZ is interesting and might help to explain why HRZ was able to explain such a large number of statements. One might argue that a category such as "Company policy and administration" is not a characteristic of work itself, but an overarching category that captures a variety of statements about decisions and regulations made by the organization. These decisions and regulations (e.g., rules governing salary) in turn influence lower-level characteristics commonly found in models of work design (e.g., equity, recognition, etc.). This interpretation helps explain the large number of

statements within the category "Company policy and administration," and begs the question whether this category is too general. As argued before, a category that is too general will reduce the quality of the interpretations and make it more difficult to make sense of the data. Further studies are needed to shed more light on this matter.

Unique categories older workers. The two top-down models jointly covered 391statements (96%), while the bottom-up model explained 403 statements (99%). This difference was nonsignificant and supports the assumption that the two top-down models can replace the time-consuming task of doing a thematic analysis required for a bottom-up model. As mentioned in the introduction, the topic of study is new and development of specific models within this domain are lacking. There are an abundance of research studies done on work characteristics and work design, but there is a lack of models including the needs of older workers. Griffiths (1999) suggests that the way forward is to establish life-span models of work design that take into account how older employees differ from younger employees. Specifically, she found that older workers care more about context issues than younger workers. The current study found support for two unique categories not captured by the top-down models: "Job redesign" and "Sharing knowledge." These categories might be specific for older workers and illuminate important differences between older and younger employees. This information, if replicated, can be used to establish life-span models of work design in the future.

The category "Job content" accounted for more statements than any other category within the bottom-up model. The subcategory "Job redesign" explained 10% of the total number of statements and most of the statements (63%) within its main category. If "Job redesign" was a main category, it would have been ranked number three, explaining the same amount of statements as the category "Salary." Most of the statements were distributed on the SWOT-level "Opportunities". This can be interpreted as an opportunity to make older employees more satisfied with their work by redesigning their job to meet their individual needs and recourses. This is in line with studies by Siegenthaler and Brenner (2001), and Walker (2005), which suggest redesigning of jobs in an attempt to retain workers for longer before retirement. Walker (2005) emphasized the difference between preventive measures, such as job redesign and lifelong training, and remedial ones, such as special training, for older workers. He also states that the focus should be on the whole working life and not only on its later part. Redesigning of jobs to meet employees' individual needs and recourses is also in line with the Norwegian Working Environment Act (Norwegian Working Environment Act 2006), and a report for FAFO by Midtsundstad (2005) concluded that job

redesign can help reduce early retirement among some employees. "Job redesign" is unique among the three models examined in this study and might reflect a characteristic of work that is highly specific for older workers. This is an indication that job redesign should be included in a life-span model of work design accounting for older workers and their needs.

Another unique category emerging from the bottom-up analysis is "Sharing knowledge," covering 7% of the total number of statements (see Table 9). Statements within this category refer to how older workers can act as mentors for younger workers, as a way of securing continuity in knowledge and skills within the organization. A study by Dendinger, Adams, and Jacobson (2005) showed that sharing knowledge with the younger generation was positively related to satisfaction among the older workers. Such knowledge management might therefore be beneficial for both the employee and the organization. If this finding can be replicated, it might be an indication that a life-span model of work design should include a category about sharing knowledge.

To summarize, the bottom-up model produced two unique categories not covered by HRZ or WIL: "Job redesign" and "Sharing knowledge." This finding could be an indication that a life-span approach to the development of models of work design is warranted. The results acquired in the current study also gives support to the notion that the two established models of work design can replace the bottom-up model, as jointly they covered a considerable number of statements. These two findings present a challenge for researchers, a challenge related to what Morgeson and Humphrey (2006) refers to when they argue that there is an ongoing challenge for researchers to find a balance between categories being too specific or too general. Should future models of work design incorporate new, unique categories based on resent research on older workers, or should researchers be content with the explanatory power of established models. As shown, established models are able to cover a considerable amount of statements from interviews, but are they able to pinpoint the salient work characteristics of today's work life? There is no clear answer to this question, and future research should continue to discuss these and similar questions regarding the quality of models of work design.

Social work characteristics. Social dimensions of work were left out of Hackman and Oldham's (1976) job characteristic model. This is one of the major criticisms of this classic model of work design (e.g., Karasek & Thorell, 1990; Morgeson, 2006). Morgeson (2006) suggested that jobs vary in terms of four social characteristics; social support, interdependence, interaction outside the organization, and feedback from others. He claims

that social job characteristics have a significant impact on employees' experience, attitudes, behavior, and performance. The relationship between social support and job satisfaction is suggested by recent studies (e.g., Morgeson & Humphrey, 2006; Humphrey et al. 2007), and there is also evidence that social support is negatively related to the intent of retirement (van der Heijden et al., 2010). Looking at the categories in WIL and HRZ, social characteristics are included in both models. In Herzberg's model, four factors can be categorized as social characteristics: "Relationship with supervisor," "Relationship with peers," "Personal life" (e.g., interaction outside the organization) and "Relationship with subordinates." In our analyses, these four factors together explained a considerable number of statements (9%, see Table 5). WIL covers three social characteristics: "Coworker support," "Participation with supervisor," and "Participation with others." Jointly, these three categories explained 15% of the statements. Taken together, this finding supports the claim that social characteristics are an important determinant within work design theory, and if replicated, indicate that social characteristics should be included in a life-span model of work design, accounting for the needs of older workers. This is in line with a meta-analysis by Humphrey et al. (2007), who showed that social characteristics influence important outcomes, such as job satisfaction, organizational commitment, and turnover.

Salary and fairness. A category accounting for statements about salary is within the top three categories across all three models. In WIL, this category is labeled "Distributive equity" and captured 23% (76 of 377) of the statements. In HRZ and the bottom-up model, this category is called "Salary," and captured 20% (74) and 10% (42) of the statements, respectively (See Table 8). First, this is interesting because many scholars see money as not important as a motivator (e.g., Herzberg et al., 1959; Jenkins Jr, Mitra, Gupta, & Shaw, 1998). Second, it is interesting that only 10% of the statements in the bottom-up model were about salary, while the same numbers for the two top-down models were 20% and 23%, respectively. It would make sense that a category regarding salary would capture approximately the same number of statements across the three models. As this was not found, some statements regarding salary must have been coded on a different category in the bottom-up model. Looking at the data reveals that most of these missing statements are coded as "Fairness". The category "Fairness" covers 8% of the total number of statements, and jointly the two categories "Salary" and "Fairness" cover statements regarding salary. This shows that many of the statements about salary are also concerning fairness. The category

that covers the largest number of statements within WIL is "Distributive equity", and taken together these results suggest that fairness is a topic of concern among the subjects.

Stereotypes towards older workers has been found to influence both supervisors' and colleagues' perceptions of older workers. Such stereotypes are labeled age discrimination when they influence employment decisions or other work related decisions (Chiu, Chan, Snape, & Redman, 2001; Kooij, de Lange, Jansen, & Dikkers, 2008). Fairness and discrimination are related terms. If the employee does not feel fairly treated, motivation to perform well might go down and motivation to retire might go up. The opposite might be true if the employee feels fairly treated. In line with this, Arnold (2005) is linking fairness and salary when he claims that financial rewards can enhance performance, especially when seen as fair and providing precise feedback regarding how well the person is doing.

To summarize, this study compares two established models of work design against a bottom-up model. The bottom-up model captured 99% of the statements from the interviews, while Herzberg's model (HRZ) and Wilson's model (WIL) captured 93% and 81% of the statements, respectively. The difference in number of explained statements between the models is significant, although HRZ is able to explain a surprisingly large number of statements. When HRZ and WIL are joined together, they explain 96% of the statements. Compared to the bottom-up model, this difference is nonsignificant. These findings indicate three possible interpretations. First, HRZ still has relevance in today's work life, as the model is able to cover many of the important dimensions of work life today. Second, HRZ and WIL together can explain almost all of the statements from the interviews (96%), indicating that HRZ and WIL can replace the time-consuming task of producing a bottom-up model. Third, the results indicate that HRZ might include work characteristics that are too general, explaining the large number of statements covered by HRZ.

The current study found support for two unique categories not captured by the two established models of work design, namely "Job design" and "Sharing knowledge." This result, if replicated, can be used to establish life-span models of work design in the future. This approach to the development of work design theory can take into account the special needs of older workers.

Limitations

The results from the current study must be viewed in light of its potential limitations.

Sample. One of the main limitations of this study is regarding the sample. The sample size is small (11 subjects) and includes only male subjects from only one of five company regions (age 61-65). In addition, the sample was not drawn randomly from the population;

however, it was done by cluster sampling. This method was necessary out of practical reasons and puts a major limitation on the inferences we can make regarding the findings. As a consequence, the external validity of the results is weak, and any generalizations to the general population cannot be justified without replication of the results. Questions regarding generalizations concerns whether the sample is representative of older workers in this particular organization, but also to what extent the organization is representative for other large, government owned, knowledge-intensive organizations. The sample in the current study is not representative of either population, as only a limited number of subjects from a limited geographical area have been studied. Future research should therefore include a larger number of subjects, evenly distributed across the company's regions, and include both male and female subjects.

Method. Another limitation of the current study is the methods used. Qualitative open-ended interviews were used to collect the data. Interviewees are sensitive to the interviewers verbal and nonverbal behavior (Hoff, 2009c), and therefore the quality of the data collection rests on the competence of the interviewer. The interviewer in the current study was the author himself, and I am not a professional interviewer. Although I have received training in interview techniques during my studies, there is no measure available to validate the quality of the interview techniques.

Another limitation regarding the methods used is the coding process. After data collection, the interviews were broken down into individual meaningful statements. This procedure is of course opens to my own heuristics and biases. Another serious weakness during this process is that every statement is weighted the same, regardless of how important the statement is for the subject. Coding, as a method, relies on the assumption that important themes will be mentioned more frequently than less important themes (Duriau, Reger, & Pfarrer, 2007). This assumption is the basis of the analyses but might not give the complete picture. The researcher relies on the assumption that the participants' viewpoints, thoughts, intentions, and experiences are accurately understood and reported by the researcher (Duriau et al., 2007), which is an objective that can never be fully realized. This uncertainty regarding how the researcher understands how the subjects perceive reality will undoubtedly affect interpretive validity (Johnson, 1997). This is a limitation inherent in all qualitative research and must be considered by anyone interpreting the results in the current study.

The author alone conducted the coding process, and this limits the reliability of the results. As no measure of inter-rater reliability is available, it is unknown to what degree the coding could be replicated by other researchers. This is a serious limitation of the study, and

future studies should include multiple coders. However, a test-retest was done on two of the interviews, giving a satisfactory reliability score. We learned in the study conducted primo 2012 that multiple coders produced very different codes. In addition to including multiple coders, future studies should therefore make sure that there is a consistency in the way the coding is conducted.

Another serious threat regarding the coding process stems from the fact that the coding of HRZ and WIL was done *after* the formulation of the hypotheses. This is a possible bias as the awareness of the hypotheses could influence the coding process in a systematic way, ultimately compromising the results. This is therefore a serious threat and future research should make sure to avoid this possibility by either; 1) conducting the coding before the formulation of hypotheses, or 2) hire someone else, without knowledge of the hypotheses, to conduct the coding. Due to both practical and pecuniary reasons this was not possible in the current study.

Content analysis reduces the richness and complexity of the data in a way that makes it possible to categorize and summarize. This is strength of the analysis. At the same time it is a weakness as some of the information in the interviews might be lost in the process. (Hayes, 2000), possibly affecting both the reliability and the validity of the results.

Validity and reliability. Validity and reliability was a concern throughout the study. Reliability may concern all parts of the research and is a measure of how consistent the measurements and procedures are. If the reliability is high, then a repetition of the study will yield similar results. Validity concerns the meaning of the results, and high validity is dependent on high reliability. When validity is high, the results are connected to reality in a meaningful way, and the procedures used measure what it is designed to measure. Limitations mentioned above are all possible threats to the validity and reliability of the findings. Moreover, two areas of concern were identified: 1) the sincerity of the subjects and 2) the quality of the research process. To ensure sincerity of the subjects, the participation was voluntary, and informed consent was given prior to each interview. The subjects were ensured full anonymity and informed that all recordings would be deleted once the data collection was completed. To ensure the quality of the research process, several steps were taken. First, as mentioned earlier, the interviewer was trained in interviewing techniques. Second, the content analyses followed guidelines recommended by the literature (Krippendorff, 2004). Third, reliability of the coding process was established by coding two interviews twice. Fourth, an extensive literature review was done prior to and during analyses of the results in order to improve the interpretation of the results. Even though these steps

were taken, the study has nevertheless serious limitations, mainly because of the small sample size. In addition, no inter-rater reliability is available because of only one researcher conducting the content analysis. Further research should therefore include a larger sample size and multiple coders.

Conclusion

In this study I addressed the significance of an inductive approach (the bottom-up model) to two deductive approaches to contemporary statements regarding work design from older employees in a large knowledge-intensive organization in Norway. One of the results of this study may appear as surprising – that Hertzberg's work design model from the 1950's was able to explain more of the data than the far more contemporary work design model by Wilson et al. This finding indicates that Herzberg's seminal theory still has relevance in present day work-life. Moreover, the data suggest that also Wilson et al.'s healthy work organization model is able to explain a large proportion of the statements from the open-ended interviews. This finding renders a high degree of credibility also to Wilson et al's. model. On the other hand, and to the disadvantage of Herzberg model, my results suggest that this classical model might be too general to capture the salient work characteristics in knowledge-intensive organizations of today. It is, of course, up to the reader to assess whether the empirical material is convincing and my conclusions are credible.

All in all, the results indicate that contemporary knowledge-intensive organizations should employ a life-span approach to work design and take into consideration older workers and their needs. One can, of course, argue that the empirical data covered in this study does not allow me to say that much about the needs of older workers on a general level. However, the research design based on open-ended interviews is seen as an advantage, as the study was able to uncover unique categories not explained by the two established models of work design. Future studies should replicate our findings with other samples in knowledge-intensive organizations.

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Appendix A - The SWOT Interview Guide

Translated to English:

1. "What do you consider good (a strength) with the senior policy in your company?"
2. "What do you consider the weakness with the senior policy in your company?"
3. "What possibilities do you see for the senior policy in your company?"
4. "What are the threats hindering improvement of the senior policy in your company?"

Original:

1. "Hva anser du er godt (styrke) ved seniorpolitikken i *NAVN PÅ BEDRIFTEN*?"
2. "Hva anser du er svakheten ved seniorpolitikken i *NAVN PÅ BEDRIFTEN*?"
3. "Hvilke muligheter ser du for at seniorpolitikken i *NAVN PÅ BEDRIFTEN* kan bli bedre?"
4. "Hva er truslene som hindrer at seniorpolitikken i *NAVN PÅ BEDRIFTEN* skal bli bedre?"

To extract as much information as possible from each subject, follow-up questions should be asked to help the subject elaborate and clarify specific statements. For example, "You mentioned… could you elaborate on that? Are there any other weaknesses regarding the senior policy in your company?"

Try to be consistent in your behavior towards the subjects. To achieve this try to develop a routine as to how you greet them, speak to them and in general behave towards them. Also, strive to be neutral by not bringing up new themes to the interviews.

Appendix B – Letter of Consent

UiO : University of Oslo
Faculty of Social Science/Department of Psychology/Work Psychology

Dato: 14 mars 2012

Deltakelse i studien "Utvikling av seniorpolitikken i [redacted]".

Dette brevet ber om din deltakelse i en studie som omhandler seniorpolitikken i [redacted].

Studentene på masterprogrammet i arbeids- og organisasjonspsykologi ved Psykologisk Institutt, Universitetet i Oslo, skal våren 2012 gjennomføre et prosjekt i samarbeid med [redacted]. Prosjektet omhandler utviklingen av seniorpolitikk i [redacted].

Studentene vil oppsummere resultatene i en rapport og presentere resultatene for forelesere i faget og representanter for [redacted]. Studien inngår som en del av den obligatoriske faglige aktiviteten for masterstudentene.

Studien vil være basert på intervjuer som varer om lag 1 time. Intervjuet vil bli tatt opp på lydopptager og deretter transkribert. Opptakene vil deretter bli slettet. Innholdet i intervjuene vil bli anonymisert, slik at de ikke vil bli mulig å spore tilbake til person. Intervjuene omfatter 4 spørsmål:

1. Hva anser du er godt (styrke) ved seniorpolitikken i [redacted].
2. Hva anser du er svakheten ved seniorpolitikken i [redacted].
3. Hvilke muligheter ser du for at seniorpolitikken i [redacted] kan bli bedre.
4. Hva er truslene som hindrer at seniorpolitikken t[redacted] skal bli bedre.

Deltakelse i intervjuene er frivillig, og du kan trekke deg når som helst og uten å oppgi en spesiell grunn.

Om du har noen spørsmål eller kommentarer, vennligst ta kontakt med professor Roald Bjørklund, Psykologisk Institutt, Universitetet i Oslo, på e-post (roald.bjorklund@psykologi.uio.no), mobil (+47-90836386).

Med vennlig hilsen
Roald Bjørklund

Jeg er villig til å delta I denne studien.

(Signert av prosjektdeltaker, dato)

Postal address:
E-mail:
www.uio.no

Appendix C – Coding Scheme

Unitizing

The definition of a unit:

- In the content analysis, a unit is an identifiable message or message component (Neuendorf, 2002, p. 71)

- Units can be words, characters, themes, time periods, interactions, or any other result of "breaking up a 'communication' into bits" (Carney, 1971, p 52, cited in Neuendorf, 2002)

The definition of a statement: A statement was defined as the smallest meaningful unit that reflects the informant's experience and understanding of the topic of interest (Hoff, Flakke et al., 2009, p. 7).

A statement is a part of a sentence, a whole sentence, or several sentences expressed by the interviewee, that constitute a coherent, meaningful point of view that describe an aspect of the work environment (Hoff, Straumsheim et al., 2009, p 14). A change from positive to negative or a change in topic may indicate a new statement.

SWOT and IGLOS categories: Statements derived from the transcription will be coded on SWOT and IGLOS. Statements that do not fit the categories will be coded as residuals.

The SWOT categories:

- Strengths: Positive aspects of the senior policy in the present situation.
- Weaknesses: Negative aspects of the senior policy in the present situation.
- Opportunities Opportunities for good senior policy in the future.
- Threats: Threats towards good senior policy in the future.
- SWOT residuals: Statements that did not fit the above categories.

The IGLOS categories:

- The individual level: Individual perceptions, feelings, and opinions.
- The group level: Interaction and cooperation in work groups, teams, and departments.
- The leadership level: Behavior of immediate supervisors, other leaders, or top management.
- The organizational level: Management practices, organizational culture, strategies, organizational goals and values, and the physical environment of the organization.
- Society level: Statements directed towards elements of external or societal matters.
- IGLOS residuals: Statements that did not fit the above categories.

The HRZ codes:

Category	Example of statements within each category
Achievement	• I am proud to work in this company because it recognizes my achievements • I feel satisfied with my job because it gives me feeling of accomplishment
Advancement	• I will choose career advancement rather than monetary incentives • My job allows me to learn new skills for career advancement
Work itself	• My work is thrilling and I have a lot of variety in tasks that I do • I am empowered enough to do my job • My job is challenging and exciting
Recognition	• I feel appreciated when I achieve or complete a task • My manager always thanks me for a job well done • I receive adequate recognition for doing my job well
Responsibility	• I am given responsibility by my supervisor • I am responsible for my own work
Growth	• I am proud to work in my company because I feel I have grown as a person • My job allows me to grow and develop as a person
Company policy and administration	• The company policy is helping me to accomplish my work • The company policy suits my needs. • I am proud to work for this company because the company policy is favorable for its workers
Relationship with peers	• It is easy to get along with my colleagues • My colleagues are helpful and friendly • Colleagues are important to me
Relationship with supervisor	• I feel my performance has improved because of the support from my supervisor • I feel satisfied at work because of my relationship with my supervisor
Salary	• I am encouraged to work harder because of my salary • I believe my salary is fair
Work conditions	• I feel satisfied because of the comfort I am provided at work • I am proud to work for my company because of the pleasant working conditions
Supervision	• I am happy with the way I am supervised • I feel the supervision-style is helping me do my best
Personal life	• My personal life influence my work in a positive way
Relationship with subordinate	• I have a good relationship with my subordinates • My relationships with my subordinates are trouble free
Status	• I feel respected at work • I am looked up to by my colleagues
Security	• I believe my job is secure • I do not feel my position in the company is threatened

The WIL codes:

Table 1. Summary information for the outcome measures included on the organizational audit

Measure	Source	No. of items	Reliability	Sample item
Job design				
Workload	Klitzman, House, Israel, and Mero (1990)	4	.78	'I am asked to do an excessive amount of work'
Control/autonomy	Hackman and Oldham (1975)	3	.77	'My job permits me to decide on my own how to go about doing the work'
Job content	House, McMichael, Wells, Kaplan, and Landerman (1979)	6	.80	'I have an opportunity to develop my own special skills and abilities'
Role clarity	Rizzo, House, and Lirtzman (1970)	4	.82	'There are clear, planned goals and objectives for my job'
Environmental conditions	Johansson, Johnson, and Hall (1991)	7	.84	'How often do each of these situations or conditions occur in your current job (high levels of noise, etc.)?'
Physical work demands	Johansson *et al.* (1991)	5	.82	'How often do each of these situations or conditions occur in your current job (heavy lifting, etc.)?'
Work scheduling	Morrow, McElroy, and Elliot (1994)	5	.84	'My work hours are unpredictable from one week to the next'
Organizational climate				
Organizational support	Eisenberger, Huntington, Hutchison, and Sowa (1986)	9	.91	'The organization really cares about my well-being'
Coworker support	Ribisl and Reischi (1993)	7	.92	'My coworkers care about me as a person'
Participation w/supervisors	Vroom (1959)	3	.77	'Do you feel you can influence decisions of your immediate supervisor regarding things about which you are concerned?'
Participation with others	Caplan, Cobb, French, Harrison, and Pinneau (1975)	3	.88	I take part with others at my workplace in making decisions that affect me'
Involvement work practices	Jamieson and O'Marra (1991)	10	.93	'To what extent does your company or organization have specific policies and/or programs in place for incorporating changes/innovations suggested by employees or employee groups?'
Communication	Vandenberg *et al.* (1999)	8	.86	'Management gives enough notice to employees before making changes in policies and procedures'

Table 1. *(Continued)*

Measure	Source	No. of items	Reliability	Sample item
Safety and health climate	DeJoy, Murphy, and Gershon (1995)	7	.90	'There are no significant shortcuts taken when work-place safety and health are at stake'
Job future				
Job security	Kuhnert Sims, and Lahey (1989)	5	.79	'I am afraid of losing my job'
Procedural equity	Greenberg (1986)	6	.95	'When pay and promotion decisions are made, all sides affected by the decisions have a say'
Distributive equity	Bavendam, Boyer, and Sorensen (1986)	4	.95	'I am fairly rewarded considering my responsibilities'
Learning opportunities	Vandenberg *et al.* (1999)	5	.90	'I am given a real opportunity to improve my knowledge and skills'
Flexible work arrangements	Bohen and Viveros-Long (1981)	6	.87	'How easy or difficult is it to arrange time to do each of the following (e.g. attend a doctor's appointment) on a typical workday?'
Psychological work adjustment				
Job satisfaction	Hackman and Oldham (1975)	5	.81	'Generally speaking, I am very satisfied with my job'
Organizational commitment	Mowday, Steers, and Porter (1979)	9	.92	'I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful'
Job stress	Cohen, Kamarck, and Mermelstein (1983)	6	.88	'In the last month, how often have you been upset because of something that happened unexpectedly at work?'
Work self-efficacy	Spreitzer (1995)	3	.81	'I am confident in my ability to do my job'
Work impact	Spreitzer (1995)	3	.88	'My impact on what happens in my work-group is large'
Employee health and well-being				
Perceived Health	Ware and Sherbourne (1992)	1	–	'In general, would you say your health is (Excellent–Poor)?'
Perceived safety at work	Original to Study	1	–	'All in all, how would you rate your work situation in terms of your personal exposure to safety and health hazards?'
Alcohol use	CDC (1998)	2	–	'How many days per month do you drink and what is the typical number of drinks consumed on those days?'

Table 1. (*Continued*)

Measure	Source	No. of items	Reliability	Sample item
High risk health behaviours	CDC (1998)	4	.71	'Have you ever been told by a doctor or health professional that your cholesterol is high?'
Preventive health behaviours	CDC (1998)	5–7	.94/.95	'How long has it been since you had your blood pressure taken by a doctor or other health professional?'

Note. The number of items comprising the preventive health behaviours measure and the specific items included were different for males and females. The first reliability is for females and the second for males.